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INSTALLATIONS FOR THE MANUFACTURE OF ANIMAL FOODSTUFFS

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Installations for the manufacture of animal foodstuffs

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SUMMARY.

Feeding of animals to increase production of meat, milk and eggs has become a science. Feed requirements for each animal are well known today, also requirements for medication, if any, to keep them healthy. Optimal values of feed components like carbohydrates, fat, animal and vegetable proteins, minerals, vitamins, roughages have been established accurately. Combination of all factors will produce optimal figures of efficiency and economy in the production of milk, meat or eggs.

To fulfil these requirements it is necessary to revert to a great number of raw materials, which in their combination give a properly balanced diet. A deficient diet would not only reduce the amount of animal products, but also increase the cost of these products considerably.

A few of the more common raw materials are varying from country to country and are the following:

- grains like maize, barley, wheat, oats, sorghum
- oil cakes and oilmeals from soybeans, groundnuts, copra
- meat meal and fish meal
- offals from various industries: flour mills
  starch factories
  sugar rafineries
- gras meal

To these many ingredients are added in usually very small proportions to supplement the naturally available raw materials or to obtain some special results:

- vitamines
- minerals
- medications

Based upon the raw materials economically available in each country or location feed formulas are established which contain up to 30 or 40 ingredients in widely varying proportions. In fact, some ingredients may represent 1/3 of the total mixture while others may only represent one part in 10 millions.

To proportion and distribute all these ingredients with the necessary accuracy through the mixture, new industrial methods and machines had to be developed and the feed milling industry was created.

Industrial feed mills have to deal with a number of basic problems for which some typical solutions will be shown:

a) Receiving

Many ingredients are normally shipped in bulk and bulk unloading from ships, trucks or cars is becoming of increasing importance. Smaller ingredients, however, are still most economically handled in bags.

b) Storage

The methods of storing ingredients will vary according to their nature and importance. For grains conventional silos are in use. Many mealy raw materials (oil meal, mill offals) can be stored in specially adapted silo bins. The size of the storage installation must be determined after careful consideration of the raw material supply. Minor and hard flowing ingredients are kept in bags.

c) Cleaning

Scalping off course foreign matters is advisable in most cases.

d) Size reduction

Grinding of grains and sometimes oil meals ist most economically and flexibly performed with hammer mills combined with suction pneumatic.

e) Mixing

The heart of any feed mill is the mixing plant. Modern installations normally rely upon one or more scales for accurately proportioning the ingredients. Fully automatic punch card systems have been developed to make the mixing process completely independent from the human element and to assure absolutely constant formulations. Batches of 1, 2, 3 tons or more are thus prepared and dumped into a suitable mixer. Extremely small ingredients are normally premixed with some carrier before adding them to the main mixer.

Mixers have been perfected to a point where homogeneous distribution of all ingredients down to one part in 100'000 can be assured after a mixing time of 4 minutes. Homogenity is measured in samples of 10 grams and variations are smaller than 5 %.

Output of mixing lines can vary from 5 tons per hour up to 30 tons per hour or more.

f) Molasses Mixer

Molasses and sometimes other liquid ingredients have to be added to the finished mixture by special continuous machines; these high speed mixers prevent any lumps from being formed.

Precautions have to be taken to assure an even flow of molasses and meal to assure accuracy.

g) Pellet mills

For many applications it has proved advantageous to form a finished feed mixture into solid pellets. Thus the animals cannot separate a once established mixture, feed intake can be higher and less losses will occure because of spillage or dust.

h) Finished products

Finished products are sold in bags or in bulk depending on the size of the orders.

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